

*Bering Sea & Aleutian Islands - Marine Mammals*

**Estimating Survival of Harbor Seals at Tugidak Island, Alaska Using Photograph-  
Identification of Individuals by Natural Pelage Markings**

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Severe declines in the harbor seal (*Phoca vitulina richardii*) population at Tugidak Island, Alaska have prompted efforts to develop efficient methods for estimating population parameters at this important haulout in the Gulf of Alaska. From 2000-2006 we photographed nearly 30,000 new or previously photographed seals to assess vital rates. We used a novel computer-assisted system to improve efficiency and reduce mis-identification error when matching photographs of seals by their natural pelage markings. Performance of this system was first assessed using a test-set of photographs from 182 individuals identified by flipper tags, scars or unique pelage markings. Results of this test indicated that (1) pelage patterns of seals that were not of dark-intermediate or intermediate color phase were unique and stable from the first year of life until 6-8 years of age, and from year to year as adults; (2) the system was highly efficient for good photographs with 0.933 of matching photographs ranking first, and 0.952 ranking in the top 0.003 of the ordered lists for visual checking; (3) visual matching and misidentification errors were low, averaging < 0.03 and 0.018, respectively; and (4) bias in survival estimates was negligible at misidentification rates of < 0.03. Finally we present preliminary results on survival of adult and subadult harbor seals using mark-recapture models, and examine effects of season (breeding vs. molting), sex, age-class, color phase, year, and environmental conditions on survival patterns.



# Alaska Marine Science SYMPOSIUM 2008

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**January 20-23, 2008**

**Hotel Captain Cook, Anchorage, Alaska**

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